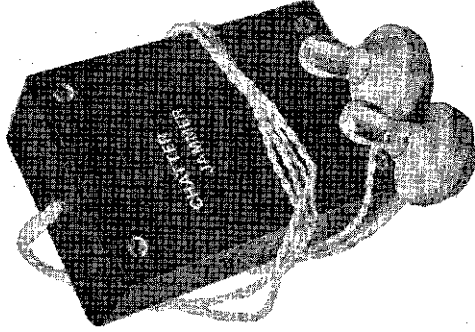


# CHATTER JAMMER

## ASSEMBLY INSTRUCTIONS



Every fan of spy movies knows that the best way to keep hidden mikes from picking up top-secret information is to repeat the information only while you've got the shower running. Why? Because the sound of the shower covers up the conversation. Probably any sound, such as jack hammers or rock music would do, but a real pro spy will settle only for a shower because it stimulates a thing called Pink Noise.

Pink noise is a special case of a large general class of signal called white noise. Whereas white noise is a Gaussian (equal probability) distribution of all possible frequencies, pink noise is a distribution which is weighted toward the audio spectrum.

Besides being able to mask outside sounds, white noise has some other interesting properties. For instance, many people find a rain storm relaxing, and, while other effects such as the high concentration of ionized air may have some effect, at least part of the general feeling of well-being can be traced to the sound of the falling raindrops - a type of pink noise. The same is true of the sound of the ocean.

Some years ago a group of dentists experimented with the use of pink noise in the place of local anesthetics. The results were questionable but in some patients the noise seemed to create a definite reaction on the nervous system so that pain sensations were blocked. Finally, several rock groups mix a little pink noise in with their recordings to add body to the sound --- which may be why so many of them are unintelligible.

The point of all this is that, if you must work in a noisy environment and sometimes have trouble concentrating or if you're just "up tight", you might want to try the Chatter Jammer, an inexpensive, shirt-pocket-size generator of pink noise that not only keeps the noise out but will probably soothe your nerves as well.

### OPERATION

Once the chatter jammer is operating properly, the only operation involved is to plug the earphone into your ears. You should immediately hear a "rushing" sound. Don't be surprised if it takes a minute or so to get used to the sound and feel of the earphones. After a short time, you will not be conscious of the rushing sound, nor will you be disturbed by extraneous sounds.

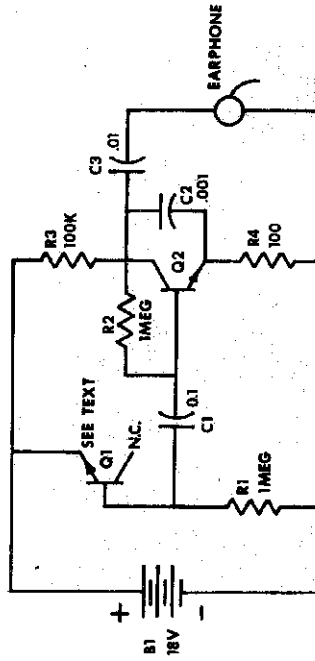
Musicians can try using the Chatter Jammer as a noise source by leaving the earphones off and connecting the output of the project to an unused hi-impedance input of their instrument amplifiers. For a really strange effect, try passing the pink noise through a variable pass-band amplifier such as the Waa Waa.

### DESIGN ANALYSIS

As can be seen from the schematic diagram, the circuit of the Chatter Jammer is simple. Transistor Q1 is a silicon type that has a low emitter-to-base breakdown voltage rating. The base-emitter junction is reverse biased by the two series-connected 9 volt batteries that make up B1. In this setup, the base-emitter junction is operated in an avalanche condition.

Resistor R1 in the base circuit of Q1 limits the current flow through the junction and also serves as the load resistor for the shot noise which results from the avalanche process. The random ac voltage fluctuations produced by the avalanche effect are coupled into a single common-emitter amplifier stage, Q2, through capacitor C1. Once the signal is amplified, it is coupled through C2 to the crystal earphones where it can be heard as a "rushing" sound similar to the sound you would hear if you held a seashell to your ear.

Capacitor C2 shunts some of the high-frequency signal amplitude away from the earphones. As a result, all sound frequencies reaching the earphones are at one signal voltage level, giving the sound its "pink" characteristic.



Schematic

## SOLDERING

Use care when mounting all components. Use only rosin core solder (acid core solder is never used in electronics work). A proper solder joint has just enough solder to cover the round soldering pad and about 1/16 inch of the lead passing through it. There are two improper connections to beware of: Using too little solder will sometimes result in a connection which appears to be soldered but actually there is a layer of flux insulating the component lead from the solder bead. This situation can be cured by re-heating the joint and applying more solder. If too much solder is used on a joint there is the danger that a conducting bridge of excess solder will flow between adjacent circuit board conductors forming a short circuit. Unintentional bridges can be cleaned off by holding the board up-side down and flowing the excess solder off onto a clean, hot soldering iron.

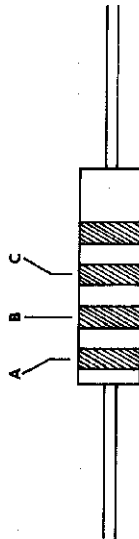
Select a soldering iron with a small tip and a power rating not more than 35 watts. Soldering guns are completely unacceptable for assembling transistorized equipment because the large magnetic field they generate can damage solid state components.

## CIRCUIT BOARD ASSEMBLY

- ( ) Prepare for assembly by thoroughly cleansing the conductor side of the circuit board with steel wool and a scouring cleanser. Rinse the board with clear water and dry completely.

Begin assembly by mounting and soldering in place all resistors following the parts placement diagram and resistor color coding guide below.

DESIGNATION	VALUE	CODE A-B-C
( ) R1	1 megohm	brown-black-green
( ) R2	1 megohm	brown-black-green
( ) R3	100K	brown-black-yellow
( ) R4	100 ohm	brown-black-brown

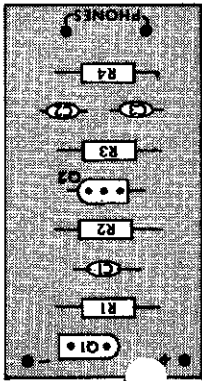


SILVER OR GOLD  
DISREGARD THIS BAND

When all resistors have been soldered in place proceed to the ceramic disc capacitors. Capacitor values are marked on the body of the component. Mount and solder ceramic disc capacitors following the parts placement diagram as listed below:

DESIGNATION	VALUE
( ) C1	.1 mfd. ceramic disc capacitor
( ) C2	.005 mfd. ceramic disc capacitor
( ) C3	.01 mfd. ceramic disc capacitor

None of the components to this point have been polarized; that is they may be mounted with either of their leads in either of the circuit board holes. When mounting transistors Q1 and Q2 note that these parts are polarized and their leads must be correctly oriented for them to operate properly. Transistors are properly placed when the flats of their cases are oriented as shown in the parts placement diagram. Transistors are heat sensitive and must be protected from temperature damage. While soldering them in place grip the lead being soldered with a pair of needle nose pliers between the body of the component and the point being soldered.



Parts Placement Diagram

DESIGNATION	VALUE
( ) Q1	2N2712 transistor (selected for noise)
( ) Q2	2N2712 transistor

Note that one of the 2N2712's has been pre-tested and selected for its noise characteristics. The middle lead (collector) of this device has been clipped short and this unit is intended for use as Q1.

Mount and solder the transistors as listed below following the parts placement diagram.

You will need two fresh 9 volt transistor batteries to power this project. They are wired in series and soldered directly into the circuit. A power switch is not used in the Chapter Jammer because the current drain of the circuit is in the low-microampere region which means you will obtain essentially shelf life from the batteries even though the unit is left on at all times.

Complete construction as follows:

- ( ) Use the solid wire provided to wire the batteries in series. Place the batteries side by side and connect the positive output of one battery to the negative output of the other.
- ( ) Connect the remaining positive output to circuit board point "+".
- ( ) Connect the remaining negative output to circuit board point "-".

The whole circuit, including batteries fits neatly into the plastic box provided. Install in case as described below and as shown in the photograph below.

- ( ) Drill a small exit hole for the earphone leads in one end of the box.
- ( ) Pass the leads of the two earphones through the hole and tie a knot about two inches from the free ends of the leads.
- ( ) Solder one lead from each earphone into each of the holes indicated in the parts placement diagram.

If desired a thin piece of styrofoam can be cut to fit inside the case to keep the battery pack from working loose. Construction is now completed by closing the case.

